

REMARKS

Claim 31 is independent and stands rejected under 35 U.S.C. § 103 as being unpatentable over Maydan et al. '612 ("Maydan") in view of Yang '699 ("Yang") and Downey et al. '281 ("Downey"). This rejection is respectfully traversed for the following reasons.

Claim 31 recites in pertinent part, "forming an *amorphous* layer at a shallow region in a *silicon substrate* by irradiating a plasma containing He..." (emphasis added). The Examiner admits that Maydan does not disclose using He as the particular gas for forming an amorphous layer. The Examiner therefore relies on Yang as allegedly obviating this admitted deficiency of Maydan. However, Yang discloses only using He as an inert element for forming an amorphous layer of a *polysilicon*, not the crystalline substrate of Maydan. Accordingly, even assuming *arguendo* the teachings of Maydan and Yang can be properly combined, such a combination does not suggest forming an amorphous layer using He in specifically a silicon substrate.

In the Advisory Action dated March 15, 2010, the Examiner maintains the pending rejection by merely concluding that "polysilicon is reasonably similar to monocrystalline silicon such that...[there would be] a reasonable expectation of success in employing He in place of Xe or Ar...in view of the disclosure by Yang that He, Xe and Ar are effective as the plasma used for amorphization." It is respectfully submitted that the Examiner's conclusion is in error.

A rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395 (2007). The Examiner's conclusion, however, is not based on "known methods with no change in their respective

functions.” That is, the known methods are only forming amorphous layers of silicon substrates using relatively heavy elements Xe, Ar (Maydan), or forming amorphous layers of polysilicon using any elements (Yang). None of the cited prior art suggests, *nor enables*, forming an amorphous layer of specifically a hard silicon substrate using specifically a light element such as He. Only Applicants have conceived of a viable manner in which such a **combination** (light element He used to form amorphous layer of hard silicon substrate) can be enabled.

Similarly, claim 1 further recites in pertinent part, “introducing boron by applying a plasma to the shallow region of the silicon substrate; and applying light having an intensity peak at a wavelength of 375nm or longer on the silicon substrate so that said shallow region is excited selectively and the shallow junction is formed electrically activated with the boron.” The Examiner admits that Maydan does not disclose the aforementioned feature, and therefore relies on Downey as allegedly obviating this admitted deficiency of Maydan.

In the Advisory Action, the Examiner maintains this rejection by asserting that “the annealing of Downey is a lamp annealing as disclosed by Maydan et al. ... and is disclosed to be suitable for activation after doping.” However, the Examiner’s conclusion does not take into consideration that Maydan ***as modified by the Examiner***, would result in the annealing of Downey causing the He to leap explosively outwardly from the Si substrate, thereby potentially roughening the surface of the Si substrate so as to damage the MOSFET by which it would not function normally (increased level of defectiveness). In this regard, accordingly, the cited prior art teaches away from using the activation annealing process of Downey in combination with a He-effected amorphous layer specifically in a silicon substrate (noting that Maydan *itself* does not disclose such a He-effected amorphous layer specifically in a silicon substrate).

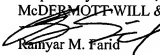
"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970). Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 31 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination. Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,
McDERMOTT-WILL & EMERY LLP


Ramyar M. Farid
Registration No. 46,692

**Please recognize our Customer No. 53080 as
our correspondence address.**

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 RMF:MWE
Facsimile: 202.756.8087
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